

REMARKS:

The Examiner rejected claims 1–5, 8 and 15 under 35 U.S.C. 102(b) as being anticipated by Nebolsine (US Patent No. 4,128,477). Claims 6, 7, 9–14 and 16–23 were rejected under 35 U.S.C. §103(a) as unpatentable over Nebolsine in view of Maxson (US Patent No. 5,156,738). Applicant has amended Claims 1, 2, 4 and 16 after an interview with the Examiner on April 1, 2005. Claim 3 has been cancelled. Antecedent basis for claims 1, 2 and 16 may be found on Applicant's pages 5, lines 26 to page 6, line 2 and 9, lines 1-7. The amendments to these claims have been added to clarify that the wastewater being treated by Applicant's process is high volume, raw sewage along with sewage overflow that must be treated rapidly during storm surges and other high volume sewage conditions that result in sewage overflow. No new concepts or matter have been added by these amendments.

RESPONSE TO CLAIM REJECTIONS UNDER 35 USC 102

Claims 1–5, 8 and 15 were rejected under 35 U.S.C. 102(b) as being anticipated by Nebolsine (US Patent No. 4,128,477). In paragraph 2, the Examiner states: "Claims 1–5, 8 and 15 are rejected ... as being clearly anticipated by Nebolsine. See col. 1, lines 6, 11, and 35; col. 2, line 31; col. 3, line 2; col. 4, lines 2-3, 35-37 and 53-54; col. 6, line 19-21 and 35 –38; col. 7, lines 10-11, 14, 23-24, 5-56 and 62; col. 8, lines 21-23; and col. 9, lines 17 –19."

TO ANTICIPATE A CLAIM, THE REFERENCE MUST TEACH EVERY ELEMENT OF THE CLAIM

Anticipation requires the presence in a single prior art reference disclosure of each element of the claim under consideration. *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). Further, "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior

art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). MPEP 2131.

Nebolsine neither expressly or inherently contains, within its four corners, every element of the claims, as amended, in question. Nor are the elements contained in Nebolsine arranged as required by the claims. Specifically, Nebolsine does not disclose a process for deep bed filtering of processing sewage only after coarse screening or degritting. The Nebolsine method teaches multiple pre-treatments and fine pre-screening of sewage (screening out particles in size from 1-70 microns.) prior to delivering the sewage to an ultra high rate or deep bed filter. See '477, col. 5, lines 11-26 and lines 32-36. These steps are required, as they are the invention: "An applicant shall particularly point out and distinctly claim the subject matter which he or she regards as his or her invention. The portion of the application in which he or she does this forms the claim or claims. This is an important part of the application, **as it is the definition of that for which protection is granted.**" MPEP 608.01(k).

COMPARING THE CLAIMS:

Applicant's Claim 1:

1. (currently amended) A process for removing BOD and suspended solids from a high volume, raw wastewater stream having sewer overflow comprising:

removing large solids from the high volume, raw wastewater stream by means consisting of degritting and coarse screening;

piping the high volume, raw, unsettled wastewater ~~directly~~ to a deep bed filter without pretreatment in a facultative zone, fine screening or chemical coagulation;
 filtering the high volume, raw, unsettled wastewater by filtration through the deep bed filter;
 backwashing the deep bed filter.

Nebolsine Claim 1:

1. A method of treating sewage fluid for discharge through an outfall to a body of sea water which comprises:

 removing dense suspended particulate materials from said fluid;

 passing said fluid through a fine mesh screen, which is between 20 and 60 mesh;

 introducing a coagulant composition to said fluid to promote coagulation of colloidal size particles in said fluid, said coagulant composition comprising a member selected from the group consisting of an alum composition, a polyelectrolyte, or mixtures thereof;

 filtering said fluid containing said coagulated particles through a deep bed multi-media filter to produce a filtrate essentially free of particles between about 1 micron and about 70 microns;

 detecting the presence of a lower quantity of oxygen in said filtrate than in the sea-water into which said filtrate is to be discharged by comparing the quantity of dissolved oxygen in said filtrate with the quantity of dissolved oxygen in the sea water;

 raising the quantity of dissolved oxygen in said filtrate to at least the level present in said sea-water in response to the detection of said lower quantity of oxygen by blowing an atomized oxygen containing gas under pressure into said filtrate; and

 discharging said oxygen treated filtrate to the sea-water through said outfall.

(emphasis added)

Nebolsine Requires Fine Screening

The Handbook of Chemistry, page 707, US Sieve Series (previously submitted) illustrates that Sieve No. 20 mesh is equal to 20.16 meshes per lineal inch. The method taught by the Nebolsine patent requires a narrow drum screening process that “will remove particles which are **larger than 70 microns** in order to protect the ultra high rate filter media.” emphasis added, *See '477, col. 5, lines 19-21*. A micron is 1000 times smaller than a millimeter. Applicant teaches and claims screening particles that are from about 6 mm (1/4 in) to 12 mm (1/2 in), over 6000 times larger than the particles screened by Nebolsine.

Nebolsine Requires Coagulants

The Nebolsine method is one in which “... heavy debris and relatively dense suspended materials are removed by conducting the effluent stream through bar racks and degritters, subjecting the effluent to narrow-range screening, admixing a coagulant composition with the effluent to promote **agglomeration of microscopic suspended solids into particles having an average mean particle size between about 1 and about 70 microns**, removing said agglomerated particles from the effluent stream by filtration... .” *Col. 2, lines 29 – 43*. Quoting Nebolsine, *Col. 2, lines 58-60*, Nebolsine states “The process requires addition of coagulants and other chemicals to the fluid to be treated.” *see Claim 1; Col. 2, lines 58 – 60*.

Applicant's method teaches direct filtration of raw sewage by piping unsettled wastewater directly to a deep bed filter with merely coarse screening or degritting prior to entering the filter. *See Application, Test Procedures and Figures 1 and 2*. Coagulation is neither used nor even discussed under Applicant's method. No treatment of the sewage is required. Applicant's filtration method for high volume, rapid waste water streams is designed to move the wastewater as quickly as

possible through the filter system without additional steps as required by Nebolsine's use of a coagulant and fine screening.

Further, Nebolsine requires a mixing basin prior to filtration, which the present application does not. In this invention, wastewater is piped to a deep bed filter without primary clarification or secondary aeration.

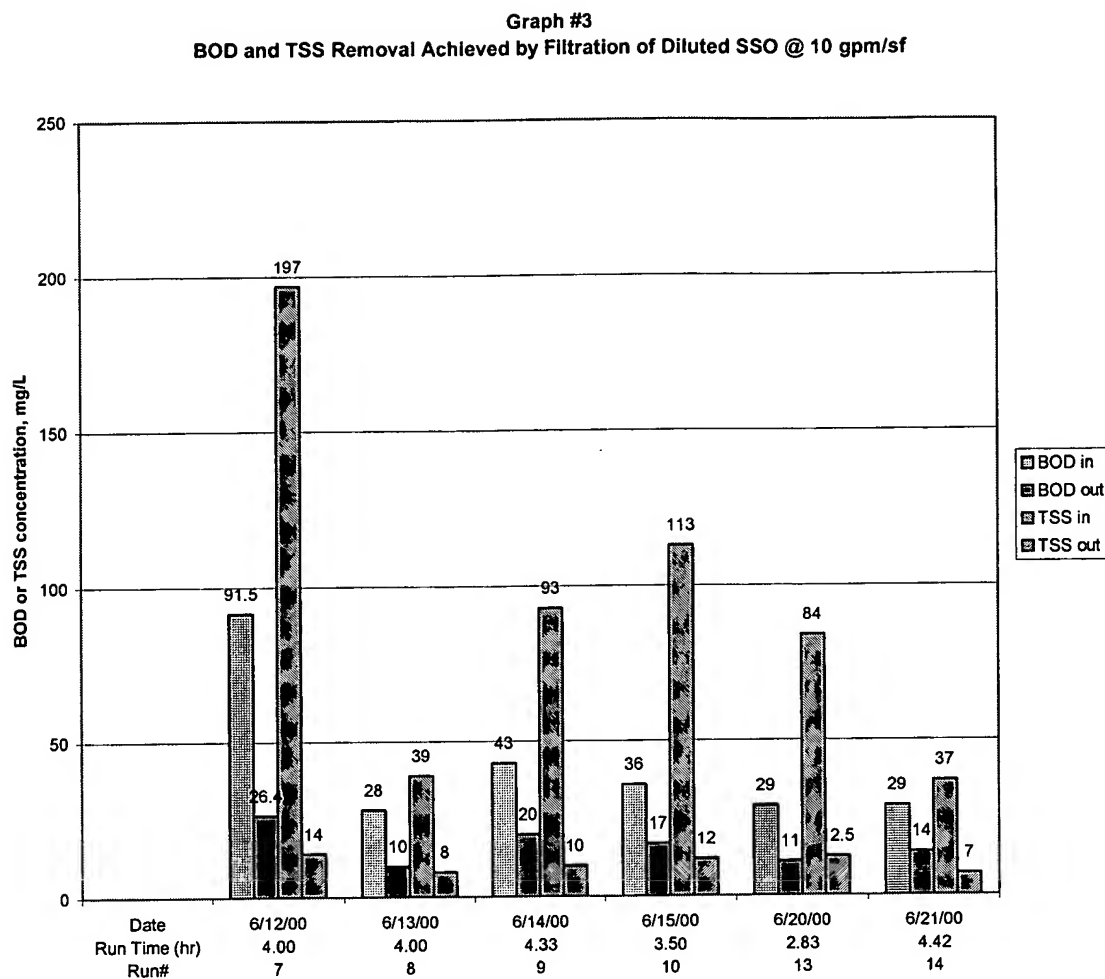
The §102(b) rejection is improper

Advantageously, Applicant's invention is simple. It requires less equipment and processing because it does not require the fine screening or coagulation (Nebolsine requires coagulation see *col. 2, lines 58-60*. Direct filtration without fine screens is designed to work particularly well during storm surges and other high volume periods requiring fast, high volume filtration. Simplicity is not inimical to patentability. *In re Oetiker*, 24 U.S.P.Q. 1443, 1446 (Fed. Cir. 1992).

Nebolsine does not state or suggest in his claims the Applicant's process for the treatment of sewage. Nebolsine requires multiple pre-treatments of raw wastewater. The direct deep bed filter of the present invention is able to quickly filter and clean wastewater, including that which has not been first prescreened down to less than 70 microns or treated by chemical coagulation as required by Nebolsine in his claim 1. The Applicant's novel method has been tested and shown to produce excellent results, as shown by the test examples:

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Example No. 3:



In the third series of tests, when treating a diluted raw wastewater by direct filtration at a rate of 10gpm/sq.ft.

Plant influent BOD, 42.8 mg/L (average)

Plant influent TSS, 93.8 mg/L (average)

Primary effluent BOD, 16.4 mg/L (average)

Primary effluent TSS, 10.6 mg/L (average)

Removal of BOD,

By Direct Filtration=61.7% (average)

Removal of TSS,

By Direct Filtration=88.7% (average)

Therefore, the Nebolsine patent neither expressly or inherently contains, within its four corners, every element of the claims in question. Specifically, Nebolsine does not disclose a process for deep bed filtering of coarsely screened sewage without prior fine screening or chemical processing. Nebolsine does not contain Applicant's Claim 1 within its four corners. For this reason, the §102(b) rejection is improper.

RESPONSE TO CLAIM REJECTIONS UNDER 35 USC 103

NEITHER NEBOLSINE NOR MAXSON, ALONE OR TOGETHER TEACH APPLICANT'S PROCESS.

The Examiner has rejected claims 6, 7, 9–14 and 16–23 under 35 USC §103(a) as unpatentable over Nebolsine in view of Maxson (US Patent No. 5,156,738). Applicant respectfully traverses this objection. Applicant requests that the Examiner reconsider and withdraw the above rejection of the claims in view of the following:

Nebolsine teaches away from Applicant's invention.

Applicant respectfully submits that nothing in the art of record teaches or suggests the present invention. For the reasons stated above, Nebolsine does not disclose the claimed invention, and neither expressly or inherently contains, within its four corners, every element of the claims in question. Nebolsine's method requires: 1) prescreening prior to filtration through a narrow screen process, having several screening steps, including screening through a drum screen until the remaining sewage particles are down to a size less than 70 microns and 2) pre-treatment by chemical coagulation. See '477, col. 5, lines 10-55, col.2, lines 58-60.

The steps taught by Nebolsine slows down the wastewater treatment. Such fine screening of the wastewater and the requirement of a chemical coagulation pre-treatment as taught by Nebolsine teaches against Applicant's point of novelty, i.e. the quick processing of wastewater during high volume conditions such as a storm surge having overflowing sewers.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). MPEP 706.02(j).

Combination of Nebolsine and Maxson Changes Principle of Operation of Applicant's Invention.

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Neither Nebolsine nor Maxson suggest the desirability of combining the elements of their invention. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). Combining Nebolsine and Maxson changes the principle of operation. Applicant's principle of operation is the rapid processing of wastewater during high volume conditions such as a storm surge having overflowing sewers. The combination of Nebolsine and Maxson would prevent this because Nebolsine requires multiple pre-treatments that

would slow down wastewater filtration and Maxson uses a short filter that cannot be used in Nebolsine and cannot handle the high volume required by Applicant's filter.

The Examiner states it would have been obvious to backwash the filter bed of Nebolsine in the manner of Maxson, since this secondary reference teaches that filter beds are typically backwashed in this manner. However, because the combined depth of the filter bed of Nebolsine is "... is much greater than has been employed in the past, special backwashing facilities are provided to afford adequate cleansing of the media." '477, *Col. 7, lines 34 – 37*. This depth is "the deep bed filter further comprising bed depths within a range of approximately 2.0 ft to approximately 10.0 ft. filtering the raw sewage wastewater by filtration through the deep bed filter" *Claim 16*.

The Maxson backwash system is for a filter bed with a much smaller depth. For example, "A mixed media bed having a bottom layer of about 6" of fine sand, a center layer of about 12" of coarse sand, and an upper layer of about 18" of coal was then placed in the filter on top of the laterals. " *Col 9, lines 30 – 34*. The filters used in the Maxson backwash system are for a filter depth of about 3 feet. This backwashing system would not be useful for the deeper filters of Nabolsine, i.e. over three feet. Therefore, it would not have been obvious to combine a typical backwash procedure for a filter bed requiring special backwashing facilities. There is no reasonable expectation of success as to the proposed modification or combination of the prior art is not designed to work for deep filters. It would change the principle of operation of the prior art invention being modified and therefore would not have been obvious to combine the two references.

The Examiner further states it would have been obvious to one to "include an additional air only backwashing treatment after the water backwashing treatment in the thus modified primary reference, in order to promote the destruction of BOD components in the sewage undergoing treatment. Such modification is deemed to be especially obvious in view of the disclosure by Nebolsine that air may be added

to the filtrate from the deep bed filter, in order to increase its level of dissolved oxygen."

Nebolsine adds air to the filtrate "In order to raise the level of dissolved oxygen in the filtrate prior to its introduction to the sea" by treating the filtrate with atomized air within the confines of the outfall pipe. However, Nebolsine is not concerned with maximizing the destruction of BOD components in the discharge:

One of the basic aims of sewage treatment had always been to limit the concentration of BOD (i.e., compositions which have a Biochemical Oxygen Demand) so as not to excessively deplete the dissolved oxygen in the receiving water body. However, due to the different ecological conditions encountered in confined fresh water bodies and the open sea, it is not necessary to adopt the same stringent BOD concentration limits for discharges to the sea and higher levels can be tolerated. '477, Col. 8, lines 31 – 39.

Nebolsine's purpose of the addition of air in this process is to increase the level of dissolved oxygen in the filtrate discharged into seawater to ensure that marine species in the area of the discharge will not be adversely affected, despite the presence of any remaining BOD constituents. '477, Col. 9, lines 19 – 24. Nebolsine is not concerned with further destruction of DOB material before discharge, but only increasing dissolved oxygen to the filtrate for prevention of shock to marine life residing in the area where the treated filtrate is discharged.

However, the Maxson patent never mentions or discusses using an air backwash for destruction of BODs. There is no suggestion or motivation to combine the referenced teachings for this purpose. An air backwash step, unlike the Examiner's contention, would not promote the purpose of the Nebolsine's air addition step, increasing the level of dissolved oxygen for marine life.

SUMMARY

Nebolsine teaches away from Applicant's invention of a process for treating high volume wastewater streams. Nebolsine requires multiple pre-treatments including fine screening through 70 micron screens and chemical processing with coagulants. See *col. 2, lines 58-60*. Such treatments slow down the filtration process so they cannot handle storm surges and sewer overflows.

The Maxson system uses a short bed filter with a backwash system that is not engineered for use with a deep bed system such as Nebolsine. Nor does Maxson claim air backwashing for destruction of BOD. It would not have been obvious to one of ordinary skill in the art at the time the invention was made to have included the backwash system of the Maxson invention with the Nebolsine process. Even if combined, these references do not teach the solution of the problem of rapid filtration of wastewater during periods of high volume.

Neither Nebolsine nor Maxson alone, nor in combination, teach the elements of Applicant's invention as claimed. Specifically, neither Nebolsine nor Maxson teach or suggest a process for deep bed filtering of processing raw, untreated sewage without prior processing.

REQUESTS

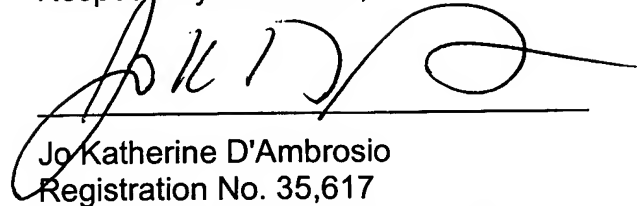
In accordance with the explanations provided, Applicant respectfully requests Examiner's withdrawal of the previous rejections under 35 U.S.C. §102 and 103 and consent to allowance of Applicant's claims 1-23, as amended.

Applicant respectfully requests a telephone interview with Examiner to resolve any questions related to this response.

Application No. 10/669,771

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Respectfully submitted,

A handwritten signature in black ink, appearing to read "Jo Katherine D'Ambrosio", written over a horizontal line.

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